PS46.

Elephant Trunk Repair of the Transverse Arch and Descending Thoracic Aorta: Long-term Experience With the Hybrid Technique

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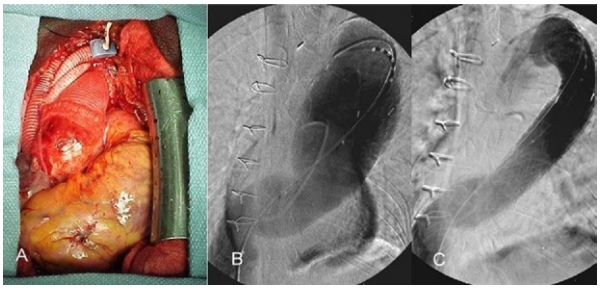
Objectives: Surgical aortic arch and thoracic aneurysm treatment with elephant trunk repair causes substantial morbidity and mortality. This study evaluated a 12-year experience with hybrid repair using a second stage endovascular exclusion technique.

Methods: Of 211 TEVARs from 1997-2009, 24 hybrid elephant trunk repairs were performed on 23 patients (mean age 72 ± 9 years) with a 3-month mean interval between stages. Indications were 18 aneurysms, 4 ulcers, 1 dissection, and 1 pseudoaneurysm.

Results: Mean follow-up was 23 months (range 1-64 months). Technical success was 88%; arch tortuosity and intraoperative hypotension/ST depression precluded stent graft deployment. 37.5% patients were symptomatic, 29.1% cases were emergent. Mean survival was 68 ± 9 months; survival at 1, 12, 24, and 48 months was 86%, 77%, 71%, and 65%, respectively. Perioperative morbidity in 2 (8.7%) patients included paraparesis and stroke. Early death in 3 (13%) patients were 2 respiratory complications and 1 ruptured AAA after successful thoracic repair. Late mortality occurred in 7 patients (1 aneurysm-related case). 4 endoleaks (1 perioperative) were observed; 1 type 3 endoleak was found 5 years after aortic expansion, and treated with graft removal and re-implantation.

Conclusions: This report shows hybrid elephant trunk repairs are safe and effective for extensive thoracic disease. Improvements in stent graft design, postoperative imaging, and longer follow-up may minimize poor outcomes.



A. 1st part of Elephant trunk procedure with open repair B. Angiographic markers assessing for placement of endograft C. Completion angiogram after deployment of thoracic stent graft.

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PS48.

Lower Extremity Ischemia Complicating Acute Type A Dissection: A Ten-Year Single-Center Experience

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Objectives: Proximal aortic dissection can lead to malperfusion syndromes affecting the cerebrospinal, cardiac, visceral and peripheral vascular beds. Traditionally, such end-organ malperfusion predicted poorer outcomes and led some groups to advocate revascularization procedures prior to proximal aortic repair. Our practice is to repair the proximal aorta first and offer additional end-organ revascularization only for signs of persistent ischemia. We analyzed our experience with this protocol in proximal aortic dissections complicated by lower extremity ischemia.

Methods: 261 consecutive patients were admitted to our department for acute proximal aortic dissection between April 1999 and April 2009. A retrospective query of a prospectively maintained aortic database was performed to assess patients who presented with lower extremity ischemic symptoms. We determined rates of malperfusion syndromes, need for peripheral bypass, and mortality. Data were analyzed by contingency table methods.

Results: 101 of 261 (38.7%) patients presented with any malperfusion syndrome. 46 of 261 (17.6%) patients presented with lower extremity malperfusion symptoms. Only 3 of 46 (6.5%) patients required peripheral bypass after proximal aortic repair for persistent ischemia. There were no deaths or limb loss in the peripheral bypass patients. In-hospital mortality rates overall, with and without lower extremity malperfusion were 12.6%, 15.5%, and 12.1% respectively (NS, $p = 0.56$).

Conclusions: Lower extremity ischemia is a relatively common manefestation of aortic dissection. Resolution of lower extremity ischemia occurs in the majority of patients after proximal aortic repair with few patients requiring peripheral bypass. Lower extremity ischemia in cases of proximal aortic dissection does not predict significantly worse results. Prompt repair of the proximal aortic dissection should be performed prior to any peripheral intervention and leads to good outcomes.

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PS50.

Aortic Customize: A New Alternative Endovascular Approach to Aortic Aneurysm Repair Using Injectable Biocompatible Elastomer

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Objectives: Aortic Customize is a new concept for endovascular aortic aneurysm repair in which a nonpolymerised elastomer is injected to fill the aneurysm sac around a balloon-catheter. Aim of this in-vitro study was to investigate the extent of aneurysm wall stress reduction by the presence of an elastomer cuff.

Methods: A latex aneurysm (inner radius sac 18mm, inner radius neck 8mm), equipped with 12 tantalum markers, was attached to an in-vitro circulation model. Fluoroscopic roentgenographic stereo photogrammetric analysis (FRSA) was used to measure marker movement during 6 cardiac cycles. The radius of 3 circles drawn through the markers was measured before and after sac-filling. Wall movement was measured at different systemic pressures. Wall-stress was calculated from the measured radius ($\sigma = pr/2t$).

Results: The calculated wall-stress was 7.5-15.6 N/cm2 before sac-filling and was diminished to 0.43-1.1 N/cm2 after sac-filling. Before sac-filling there was a clear increase ($p < 0,001$) in radius of the proximal (range 7.9% - 33.5%), middle (range 3.3% - 25.2%) and distal (range 10.5% - 184.3%) rings with increasing systemic pressure. After sac-filling with the elastomer there remained a small, significant ($p < 0,001$), increase in the radius of the circles (ranges 6.8% - 8.8%; 0.7% - 1.1%; 5.3% - 6.7%). The sac-filling reduced the extent of radius increase. The treated aneurysm withstood pressures up to 220/140 mm Hg without noticeable wall-movement.

Conclusions: Filling the aneurysm sac with a biocompatible elastomer leads to successful exclusion of the aneurysm sac from the circulation. Wall-movement and calculated wall stress are diminished noticeably by the injection of biocompatible elastomer.

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PS52.

Relationship of Aneurysm Sac Regression and Type II Endoleak: Role of the Inferior Mesenteric Artery

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Objectives: Endovascular repair (EVAR) of infrarenal aortic aneurysms (AAA) is increasingly utilized in patients with suitable aortic morphology. Despite improvements in graft design, type II endoleak (EL-2) either from the inferior mesenteric artery (EL-IMA) or lumbar artery (EL-LA) remains the Achilles' heel of EVAR. The objective of this study is to evaluate AAA sac diameter in patients with and without EL-2. Our hypothesis is: persistent EL-2 is associated with inferior sac regression.

Methods: Retrospective analysis of all nonruptured AAA treated by elective EVAR using FDA-approved endografts from January 2005 to December 2008 at Mercy Medical Center, Des Moines, IA was performed. Review of medical records, preoperative and follow-up CT angiograms (CTA) at 1 and 6 months were performed. Patients with type I, III and IV endoleak were excluded. Change in AAA sac diameter at 6 months was compared in patients: 1) with and without EL-2; 2) with occluded vs patent IMA.

Results: The study cohort comprised of 198 patients (165 men, 33 women, mean age 74 years). Mean preoperative AAA diameter was 5.5 cm (range 4-11 cm). EL-2 was present in 27% at completion of EVAR and persisted in 9% at a mean follow-up of 6 months (range 4-8 months). 94% of EL-LA resolved on follow-up vs 55% of EL-IMA ($p = 0.01$, Fisher exact test). Mean change in sac diameter at 6 months was +0.04 cm in patients with EL-2 vs −0.48 cm in patients without EL-2 ($p = 0.002$, t test). Preoperatively, the IMA was occluded by coils or chronically occluded in 92 patients vs 105 patients who had a patent IMA. At 6 months, mean change in sac diameter was +0.06 cm in patients with a patent IMA vs −0.57 cm in patients with an occluded IMA ($p < 0.001$, t test).

Conclusions: Persistent EL-2 following EVAR occurred in 9% of patients, predominantly from the IMA. 55% of EL-IMA did not resolve and lead to increase in sac diameter. Occlusion of the IMA led to greater sac shrinkage following EVAR and should be considered when the IMA is widely patent.

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PS54.

Type IV Thoracoabdominal Aortic Aneurysm Repair: A Large Single-Center Experience

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Objectives: To examine the mortality and morbidity of Crawford type IV thoracoabdominal aortic aneurysm (TAAA) repair at a single university hospital over 10 years.

Methods: All patients undergoing open type IV TAAA repair between 1998 and 2008 were prospectively entered into a database (n = 108). Repairs were performed through a left retroperitoneal incision.